

FOOD LABEL EVALUATION IN ADOPTION PROCESS OF FUNCTIONAL FOOD

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Abstract

The objective of this research is to identify the effect of food label information on the adoption process of functional food. The laboratory experiments were conducted with specific and general food label as the experiment treatment. One hundred and ninety-nine subjects were selected; those were the ones who served as decision makers in buying food for themselves or their families. The data was analyzed with the compare means analysis which are paired samples test and independent samples test. The result shows that food label evidently increases subjective and objective knowledge. However, this study does not prove that specific food label with institution certification increases knowledge better than general food label. Consistently, perceive persuasion can not be strengthened by the institution certification in specific food label.

Keywords: food label, knowledge, persuasion, functional food

Abstrak

Penelitian ini bertujuan untuk mengidentifikasi pengaruh informasi label pangan pada proses adopsi pangan fungsional. Penelitian ini dilakukan dengan desain eksperimen laboratorium dengan menggunakan label pangan spesifik dan umum sebagai perlakuan dalam eksperimen. Seratus sembilan puluh sembilan partisipan dipilih dengan kriteria individu berperan dalam pengambilan keputusan pembelian bahan pangan bagi individu tersebut maupun keluarga. Analisis data dilakukan dengan uji beda rata-rata baik uji beda sampel berpasangan maupun uji beda sampel independen. Hasil analisis menunjukkan bahwa label pangan secara signifikan meningkatkan tingkat pengetahuan baik subjektif maupun objektif. Namun demikian, studi ini tidak dapat membuktikan bahwa label pangan spesifik yang dilengkapi dengan sertifikasi institusi yang relevan meningkatkan pengetahuan dan pembentukan sikap positif secara lebih baik dibandingkan dengan label pangan umum.

Kata kunci : *food label, knowledge, persuasion, functional food*

1. Research Background

Since 1990 food labeling has served as a means of communication used to meet the need for information and health (Kim *et al.*, 2001), including means of marketing communication of functional food in agribusiness. Food labeling included in marketing program of this innovative product aims to inform product attribute so as to build an attitude to achieve better life health quality. The harder to observe the product attribute, the greater the efforts made by

marketers. (Chauduri, 1994; Lee and O'Connor, 2003). One of the efforts is to include health claims, nutrition claims and product certification. In 1991, Government of Japan issued a regulation of Food for Specific Health Use (FOSHU) in which it required local health department's approval on the inclusion of health claims for functional food (Verschuren, 2002). On the contrary, in Indonesia regulation on claims in food labels is not stipulated perfectly yet.

Complete information on food labeling aims to provide comprehensive and accurate attribute information to consumers. It is due to the fact that information on food labeling can reduce uncertainty that faced by consumers (Zarkin and Anderson, 1992) and ensure that consumers receive adequate information and education on the quality and benefits of the products. Hence, the product can be appropriately chosen (Emirogiu, 2002; Verbeke, 2000). However, the effective use of comprehensive information covering health claims, nutrition claims and certification still remains a question to many. The development of empirical studies on food labeling has not given answers yet as the already conducted researches only studied food labeling formats (Maheswaran and Meyers-Levy, 1990); the role of demographic and psychographic factors to determine the food labeling user (Siu and Tsoi, 1998), the decision on labeling user profile in garment industries (Dickson, 2001); effect of advertisement claim types on consumer generalization (Andrew *et al.*, 1998); the test on the effectiveness of label design combination in front and back packaging (Wansink, 2003).

The data on functional food sale in Indonesia shows that the variety of information on food labeling in the functional food packaging, for instance eggs enriched with Omega-3, does not have an effect on the consumers' behavior to exercise choices and decision to buy the product. Totally the selling value of all egg brands enriched with Omega-3 only reaches 0.3 – 0.5% from selling total value of conventional chicken's eggs per year and equally divided into all existing brands (Marketing, 2006).

This condition indicates the importance of study on consumer's evaluation process over functional food labeling in order to influence healthy life behavior. The study should specifically focus on the effect of food labeling on product knowledge level, perceived persuasion in the adoption process of functional food. The study result is expected to give both the answer of effectiveness of food labeling and input to develop effective food labeling in functional food marketing.

2. Literature Review

2.1. Development of Functional Food in Animal Husbandry Industries

Functional food is a group of food which deliver health benefits out of the basic substance functions (Astawan, 2003; Verschuren, 2002), consisting of general food material consumed in normal amount, but not the product for specific consumers with supplementary material or food for diet purposes (Oversen, 1999). The functional food has a significant role for consumers with various health statuses as its function ranges from maintaining good health to reducing sickness risks (Verschuren, 2002).

The consumers' tendency to pay more particular attention to quality, health, convenience and product variety in their choice for food material is a challenge for producers to develop new products (Verbeke, 2000). Several food innovations in agribusiness industry have been conducted to some agricultural basic commodities by changing and highlighting product attributes (Baker and Bruce, 1995). For instance, eggs enriched with Omega-3 are developed to produce eggs with content of saturated fatty acid and lower cholesterol level (Hargis and Van Elswyck, 1993 in Hardini 2002). This innovation is expected to improve egg consumption to consumers with higher education levels or with health problems (Wang *et al.*, 1996).

Based on the product quality concept, the attribute in the functional food is an attribute with credence quality. In general, credence quality is formed in the production process (Bernues *et al.*, 2003). This attribute requires high detection cost both before and after purchasing the product (Anderson and Phillipsen, 1998 in Becker, 2000). The reason is that the process attribute evaluation cannot be conducted directly through internal and experience indicators since consumers cannot evaluate the product performance well even though the consumption process is already done (Park *et al.*, 1994). Therefore, credence attribute evaluation process is carried out with a quality indicator, which is not attached in the product; those are food labeling (Baltas, 2001) and certification issued by the institution founded by producers, independent institutions or public authority (Berneus *et al.*, 2003; Hoffmann, 2000).

2.2. Food Labeling as Source of Information for Functional Food Material

The use of food labeling is getting more beneficial especially when consumers do not have an access to evaluate nutritional value of food product. In this case, food labeling is a useful way to help consumers decide to choose products in accordance with the health purposes (Worsley, 2002). The information generally includes brands, contents, ingredient contents, logo to indicate specific claims, health claims, usage instructions and educative information on healthy eating habit (Higginson *et al.*, 2002).

In its progress, food labeling has a wide variety of information. Understanding food labeling covering information on nutrition and health is getting more important for producers in accordance with consumers' higher awareness about health and nutrition. Information on food labeling influences perceptions, preferences, expectations before buying the product and evaluation after using the product (Ford *et al.*, 1990). The information also turns credence attribute in the product into search attribute (Caswell and Mojduzka, 1996), serves as an education process for consumers on healthy eating habit (Webster, 2002) and directs consumers to the right choice, stimulate consumption and healthy food production (Baltas, 2001).

Food labeling in the functional food products category covers information closely related to health claims. For producers, the argumentation on the use of health claims is the most rational way to promote product knowledge in order to increase a health effect beneficial for consumers (Oversen, 1999). The claim can consist of information about nutritional content and the amount of content and role of nutrition for the body. Besides, the claim can be in the form of

health claims as an explanation of relation between the food product or nutrition or other material contained in the food material and the sickness or specific health condition.

2.3. Development of Research Hypothesis

Consumers' awareness on the need for food labeling is increasing (Higginson *et al.*, 2002). Food labeling is an external indicator to convince consumers through disseminating information and education on the quality and benefits of products (Emirogiu, 2002; Verbeke, 2000). It also plays a role to improve nutrition intake so as to promote health condition of community (Zarkin and Dean, 1993). The communication, which may bridge the gap of knowledge on uncertainty aspects of innovation, can make social reinforcement a significant role in building attitude towards innovation (Becker, 2000).

H₁: Individual's knowledge after being exposed to food labeling is better than before being exposed to food labeling

In developing new products, a health claim serves as a factor which can stimulate the development and the success of health food product (Ippolito and Mathios, 1991). Specific information with a cause claim can improve consumers' attention (Olson, 1975) and promote motivation to conduct the process of information understanding (Berger *et al.*, 1999).

H₂: Individual's knowledge which is exposed to food labeling with specific claims increases higher if compared to the one exposed to food labeling with general claims.

The harder the observation processes of credence attribute, the greater the need to use quality standards of industries or public as external indicators (Hoffmann, 2000). The trust of credence attribute evaluation can be improved by using eccentric indicators conducted by credible institutions (Frewer *et al.*, 1999 in Frewer *et al.*, 2003) established by producers, independent institutions or public authority (Berneus *et al.*, 2003; Hoffmann, 2000).

H₃: Perceived persuasion process is strongly formed by the individual exposed to food labeling with certification compared to the one exposed to the food labeling without certification.

3. Research Method

Laboratory experiment design was used in this study with the following consideration; the design was appropriately used to test causal relation (Neuman, 2000), that is the information difference effect in the food labeling with general information and the food labeling with specific information. Measurement on difference effect was conducted with variables of knowledge and perceived persuasion. Measurement on knowledge variable was carried out subjectively in the form of individual's perception of individual's knowledge

levels on an object and objectively to gain individual's actual knowledge (Park *et al.*, 1994).

One hundred and ninety nine (199) participants were involved in the experiments. They were grouped into experiment groups with the random assignment in order to boost trust that the variation of participants were normally distributed in the experiment groups (Cooper and Schindler, 2006) and there was no difference on systematic subject among group treatments (Neuman, 2000). Experiment was conducted by conditioning the subjects in the blind experiment in order to eliminate subject reaction effects to experiment manipulation (Rostchild and Houston, 1980; Babbie, 1998; Cooper and Schindler, 2006).

Manipulation check was carried out to examine that the instrument used in the research was perceived similarly both by respondents and researchers. The results shows that respondents perceive these two label forms developed by the researchers have difference in the form of formats related to health claim information, nutritional value information and certification institution. New food labeling for eggs enriched with Omega-3 was developed by the researchers in order to avoid familiarity. Food labeling exposition in the experiment was carried out together with product packaging, and two other products were included in order to improve neutrality of laboratory experiment.

4. Result and Discussion

4.1. Result

The test for food labeling effect to increase consumer's knowledge was conducted with mean difference analysis of knowledge variables measured before and after exposition by using paired samples test. The test result (Table 1) shows that there is a difference both for subjective and objective knowledge before and after getting exposed to food labeling both in general format or specific one. Specifically, food labeling exposition both in general format or specific one is able to improve consumer's actual knowledge and perceptual one.

Table 1. Mean Difference Test on Knowledge Level Before and After Getting Food Labeling Information

Note	Knowledge Level Difference Before and After Getting Food Labeling Information		
	Mean	Deviation Standard	t test
Subjective knowledge	-0.449	0.981	-6.447 ***
Objective knowledge	-0.231	1.105	-2.953 ***

Note: *** significance at $\alpha=1\%$

Hypothesis testing that specific food labeling has an effect on the increase of better knowledge if compared to the general food labeling was conducted with mean difference analysis of independent samples test. The test began with confirmation of variance homogeneity in those two groups in order to confirm variance besides independent variables, which can influence the difference between those two groups.

Table 2. Homogeneity Test of Knowledge Variable Variance on Experimental Groups between Specific Information and General Food Labeling Treatment

Note	Food Label	Number of Samples	Mean	Deviation Standard	Levene's Test
Subjective knowledge	Specific	96	4.488	1.496	0.411
	General	103	4.478	1.611	
Objective knowledge	Specific	96	5.396	1.676	0.864
	General	103	5.359	1.658	
Perceived persuasion	Specific	96	6.363	0.761	0.169
	General	103	6.204	0.927	

The test result on variance homogeneity (Table 2) shows that there is no variance difference between experiment groups. Hence, the test on the knowledge level mean with specific and general food labeling treatment can be conducted. The result of mean difference analysis in Table 3 shows that there is no difference on knowledge levels both for specific and general information. Therefore, the study result cannot support the idea that specific food labeling can provide the participants with stronger subjective and objective knowledge than the food labels with general information.

Test of certification effect in specific food labeling on the perceived persuasion is examined with mean difference analysis of independent samples test. Analysis was carried out by examining variance of food labeling groups with certification and food labeling without product certification. The test result in Table 2 shows that the variance assumption test with Levene’s test indicates no difference variance, which harms the test of certification effect.

Table 3. Mean Difference Tests of Knowledge, Knowledge on Product Innovation, Use and Function of Innovation, and Perceived Persuasion of Experiment Groups Who Gain Information about Specific and General Food Labeling

Note	Mean Difference Test of Group Difference for Specific and General Food Labeling			
	Experiment Groups	Sample	Mean	t test
Objective knowledge	Specific	96	4.488	0.154
	General	103	4.478	
Subjective knowledge	Specific	96	5.396	0.045
	General	103	5.359	
Knowledge on product innovation	Specific	96	2.323	-0.588
	General	103	2.427	
Knowledge on nutritional value	Specific	96	0.688	1.174
	General	103	0.563	
Knowledge on Innovation function	Specific	96	1.615	0.822
	General	103	1.553	
Knowledge on Innovation use innovation	Specific	96	1.458	0.720
	General	103	1.379	
Perceived persuasion	Specific	96	6.363	1.320
	General	103	6.204	

The mean difference analysis in Table 3 indicates no significant difference on the perceived persuasion variable as the effect of certification in specific food labeling. Hence, efforts to highlight the product information done by the independent institutions through certification are not able to create a stronger persuasion effect compared to the food labeling with no certification. In other words, participants believe that the producers who have a marketing interest could build up participants' positive behavior on the functional food products. Producer's role is as strong as that of independent institution, which issues certification.

4.2. Discussion

The effect of food labeling to increase information is consistent with actual and perceptual information. However, the prediction that specific food labeling can significantly improve knowledge, which is stronger than the general food labeling, is not supported in this study. Specific food labeling does not have an effect on increasing consumer's knowledge, even though respondents prefer specific label format. The previous label shows that even though consumers tend to prefer comprehensive food labeling as source of information, but the idea is not shown in the real behavior (Asam and Bucklin, 1973; Levy *et al.*, 1996). Consumers generally need the most complete information displayed in food labeling, but the test with the study of Levy *et al.* (1996) even shows lowest cognitive response. Furthermore, information on nutritional value displayed in the specific food labeling force the subject to carry out transformation process in the information process due to the fact that the information displayed is nutritional value in mg per 100 gr egg; that is the same as 1.5 eggs. The failure of transformation process occurs because the subject does not want or able to use the information effectively and the subject encounters a problem to remember quantitative value of nutritional value content. The other study shows that the individual tends not to use the information, which forces the subject to carry out transformation process (Jacoby *et al.*, 1977). Therefore, the theory placing preference to food label that the consumers will get more benefits as long as they get more information cannot be shown significantly in the statistics of this experiment. Analysis in the dimension level (Table 3) shows the same result indicated by no difference on objective knowledge dimension; that is an knowledge on innovation, function and the use of innovation as well as an knowledge on nutritional value in those two research groups.

Nutrition claim in the specific food labeling does not have an effect on increasing knowledge. Participants understand that nutritional value content of eggs enriched with Omega-3 is higher than that of ordinary purebred chicken, but they find it hard to remember the nutritional value. The study conducted by Hackleman (1981) notes that consumers show dissatisfaction with information on food labeling completed with nutritional value content because the information, especially the display of several nutritional values in the food material, is often confusing. In this study, detailed nutrition claim does not increase subject's ability to provide answers over objective questions on nutritional value of eggs. The failure on that evaluation is also consistent with

the measurement of objective knowledge because the subject who has exposition of specific food labeling perceives the same level of knowledge as the group getting the exposition of general food labeling. Hence, the display of nutritional value information in the food labeling needs to be revised to provide nutritional value, which is limited to the consumer's needs for relevant information in order to evaluate the products (Hackleman, 1981). It also needs to be understood by the institution in charge of setting up the regulation on the display of nutritional value information in the food labeling.

Besides, specific food labeling completed with formal certification from the authorized institution does not create stronger persuasion compared to the food labeling with no certification. In this case, food labeling developed is not able to meet the norm of comprehensibility in which it serves as the label's ability to provide the consumers with information about the product without looking through the product contents (Underwood and Ozanne, 1998). This failure is caused by the fact that functional food is a product with credence attribute whose benefits is more difficult to feel if compared to the product with either finding attribute or experience attribute (Becker, 2000). Certification does not give a picture of basic credence quality; those are content of Omega-3 in eggs and attribute benefit for health in the long run.

5. Conclusion and Suggestion for Future Empirical Research

Conceptually the comprehensive and accurate information is a significant factor in the evaluation process related to health, but it is not applicable for consumer's evaluation process to food labeling. The comprehensive information in food labeling is not optimally used in the evaluation process. The benefit of comprehensive information is only limited to fulfilling formal requirements from the authorized institution, which is in charge of setting up regulation on food material trade, but unfortunately not optimally, used by consumers. Hence, producers should rethink of food labeling format, which ease evaluation process on innovation process, process of production system and accurate consumption limitation.

The result suggests a further research on food labeling format, which is simple and informative in order to stimulate a better information evaluation process. Concerning the subject's trust level on product certification, it is advisable to conduct a research in order to find the possibility of certification issued by credible institutions (for instance, producer association) to ensure better guarantee on the certainty of credence product production process.

Acknowledgement

The author would like to thank Prof. Dr. Asip F. Hadipranata, Prof. Dr. Basu Swastha Dharmmesta, MBA and Dr. BM. Purwanto, MBA for their helpful comments and suggestions on earlier drafts.

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